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EMPLOYMENT

Department of Mathematics, Imperial College London *September 2020 - present*
Chapman Fellow in Mathematics

- Initiated and developed 3 new projects on model-dependent anomaly detection for particle physics and interpretability of high-dimensional classifiers, using optimal transport, nonparametric density estimation, active subspace and variable importance methods.
- Developed and delivered a postgraduate module on Data Science, supervised 3 Master's theses and 2 undergraduate projects, undertook mentorship roles and participated in the undergraduate and postgraduate exam boards.

Department of Statistics & Data Science, Carnegie Mellon University *May - June 2020*
Postdoctoral Transitional Teacher

- Developed and delivered the Statistical Graphics and Visualization undergraduate module.

ACADEMIC QUALIFICATIONS

Department of Statistics & Data Science, Carnegie Mellon University *May 2020*
Ph.D. in Statistics

- Thesis Title: Inference for Clustering and Anomaly Detection
- Thesis committee: Larry Wasserman (Chair), Sivaraman Balakrishnan, Mikael Kuusela, Andrew Nobel, Rebecca Nugent, Alessandro Rinaldo
- Initiated and developed 4 research projects on inference for clustering to detect the number of clusters, model-independent anomaly detection for particle physics using classifiers, graph convolutional neural networks and statistical analysis of Chikungunya Fever, and initiated collaborations with 7 researchers from the Statistics & Data Science department and with epidemiologists from the University of Pittsburgh.
- Developed and delivered 4 undergraduate modules, was a teaching assistant for 10 undergraduate and postgraduate modules, and undertook outreach and mentorship roles.
- Presented my research at conferences, workshops and seminars.

Machine Learning Department, Carnegie Mellon University *May 2018*
Secondary Masters in ML

Indian Statistical Institute, Kolkata *May 2014*
Master of Statistics
Specialization: Mathematical Statistics and Probability

Indian Statistical Institute, Kolkata *May 2012*
Bachelor of Statistics (Hons.)

PUBLICATIONS

4. **Gaussian Mixture Clustering Using Relative Tests of Fit**
   Purvasha Chakravarti, Sivaraman Balakrishnan and Larry Wasserman
   · Submitted to Journal of the Royal Statistical Society: Series B (JRSSB) (2021).
   · Preprint - arXiv:1910.02566.
3. **Model-Independent Detection of New Physics Signals Using Interpretable Semi-Supervised Classifier Tests**
   Purvasha Chakravarti, Mikael Kuusela, Jing Lei and Larry Wasserman
   · Received a major revision at Annals of Applied Statistics (AOAS) (2021).
   · Preprint - arXiv:2102.07679.
2. **A Generalization of Convolutional Neural Networks to Graph-Structured Data**
   Yotam Hechtlinger, Purvasha Chakravarti and Jining Qin
   · Preprint - arXiv:1704.08165.
1. **Spatially Adaptive Kernel Regression Using Risk Estimation**
   Sunder Ram Krishnan, Chandra Sekhar Seelamantula and Purvasha Chakravarti
   · Published in IEEE Signal Processing Letters, 2014.

In Preparation

- **Robust Signal Detection using a Classifier Decorrelated through Optimal Transport (CDOT)**
  Purvasha Chakravarti, Mikael Kuusela and Larry Wasserman
  · To be submitted to Annals of Applied Statistics (AOAS) in early 2022.
- **Interpreting Classifiers: Development of the Active Subspace Search**
  Thomas Andradi-Brown and Purvasha Chakravarti
  · To be submitted to International Conference on Machine Learning (ICML) 2022.

INVITED TALKS

Search for New Physics Signals Using Interpretable Classifiers 2021, 2022

· Statistics Seminar in the Statistical Laboratory, Department of Pure Mathematics and Mathematical Statistics (DPMMS), University of Cambridge, scheduled for February 2022.
· Maths Inspirational Lecture, Imperial College London, scheduled for January 2022.
· School of Mathematics, The University of Edinburgh, December 2021.
· School of Mathematics, Cardiff University, December 2021.
· School of Mathematics and Statistics, University of Sheffield, November 2021.
· School of Mathematical Sciences, Queen Mary University of London, November 2021.

Clustering with Significance Guarantees Using Relative Tests of Fit (RIFT) 2021

· The Analytics and Operations Group, Imperial College Business School, November 2021.

Model-Independent Detection of New Physics Signals Using Interpretable Semi-Supervised Classifier Tests 2020, 2021

· Inter-experiment Machine Learning (IML) Working Group, CERN, 2021.
· 4th Inter-experiment Machine Learning (IML) Workshop, CERN, 2020.
· Statistical Inference & Machine Learning Workshop in the Big Data and Machine Learning in the Natural Sciences Group, Imperial College London, 2021.

Inference for Clustering and Anomaly Detection 2020

· Imperial College London

A Generalization of Convolutional Neural Networks to Graph-Structured Data 2019

· Poster at The Science of Deep Learning, National Academy of Sciences Arthur M. Sackler Colloquium, Washington, D.C.

Gaussian Mixture Clustering Using Relative Tests of Fit (RIFTs) 2018

· Working Group on Model-Based Clustering Summer Session, Ann Arbor, Michigan.

Women in Statistics at Carnegie Mellon University 2016

· Women in Statistics and Data Science Conference, Charlotte, North Carolina, jointly presented with Shannon Gallagher.

CONTRIBUTED TALKS & SEMINARS

· Model-Independent Detection of New Physics Signals Using Interpretable Semi-Supervised Classifier Tests - JSM, Virtual Conference, 2021.
· Model-Independent Detection of New Physics Signals Using Interpretable Semi-Supervised Classifier Tests - Centres for Doctoral Training (CDT) Seminar, Imperial College London, 2020.
· Inference for Clustering and Anomaly Detection - Statistics seminar, Imperial College London, 2020.
· Gaussian Mixture Clustering Using Relative Tests of Fit - JSM, Denver, Colorado, 2019.
· Hierarchical Significance Testing for Gaussian Mixture Clustering - JSM, Vancouver, Canada, 2018.
· Statistical Significance of k-Means Clustering - JSM, Baltimore, Maryland, 2017.
· Statistical Analysis of the Chikungunya Fever - Women in Statistics and Data Science Conference, Charlotte, North Carolina, 2016.

TEACHING

Data Science (Imperial College London MATH97309) Spring 2021

· Designed, structured, developed, and delivered a new 5 ECTS module for the MSc Statistics program with 62 students.
Evaluation (0-5, 5-highest) (Response Rate: 24%): Teaching = 4.46

Statistical Graphics and Visualization (CMU 36-315) Summer 2020

· Developed and delivered a 9 credits undergraduate 3rd year course with 32 students.
Evaluation (0-5, 5-highest) (Response Rate: 28%): Overall = 4.32; Teaching = 4.25

Introduction to Probability Theory (CMU 36-225) Summer 2019

· Developed and delivered a 9 credits undergraduate 2nd year course with 43 students.
Evaluation (0-5, 5-highest) (Response Rate: 91%): Overall = 4.1; Teaching = 4.15

Reasoning with Data (CMU 36-200) Summer 2018

· Delivered a 9 credits undergraduate 1st year course with 8 students.
Evaluation (0-5, 5-highest) (Response Rate: 25%): Overall = 5; Teaching = 3.5

Introduction to Statistical Inference (CMU 36-226) Summer 2017, 2016

· Developed and delivered a 9 credits undergraduate 2nd year course with 31 and 26 students respectively.
Evaluation (0-5, 5-highest) (Response Rate: 57%, 67%): Overall = 4.69, 4.42; Teaching = 4.75, 4.42

Teaching Assistant

Creating assessments and solutions, organizing marking, conducting tutorials, maintaining discussion forums, and holding office hours.

· Sampling, Survey and Society, Spring 2019
· Modern Regression, Fall 2018 and 2014
· Advanced Methods for Data Analysis, Spring 2018, 2017 and 2016
· Intermediate Statistics, Fall 2017 and 2016
· Introduction to Probability Theory, Fall 2015
· Probability and Mathematical Statistics (Hons.), Spring 2015

Personal and Academic Tutoring

· Personal tutor to 7 undergraduate and 6 postgraduate students.
· Conducted probability academic tutorials for year 1 undergraduate students.

SUPERVISION

Proposed and was the main supervisor for the following projects which included designing, planning and guiding the project through regular weekly meetings.

MSc Statistics Thesis Supervision

Steve Fayek (joint supervision with Alastair Young) 2021

· Thesis: Statistical Significance for Hierarchical Clustering in the HDLSS Setting.

Thomas Andradi-Brown 2021

· Thesis: Interpreting Classifiers: Development of Active Subspace Search and Comparison with other Techniques.

Liuting Lu 2021

· Thesis: Collective Anomaly Detection Using Semi-Supervised Classifier Tests with an Application in High-Energy Physics.

Undergraduate Supervision

Amin Akhtar, Ziyao Jin, Juhyeong Lee, Wanhang Li, Ailin Sun 2021

· Title: An Investigation into High-Dimensional Two-Sample Hypothesis Testing using Classifiers.

George Hutchings 2021

· Thesis: Statistical Tests to Detect the Number of Clusters Present in the Data.

FUNDING AND AWARDS

Funding (Total: GBP 106,360)

- **Chapman Fellowship (GBP 100,158)**
  Awarded by the Department of Mathematics, Imperial College London for 2020-22.
- **GSA/Provost Conference Funding (GBP 1,635)**
  Awarded conference funding to attend the Joint Statistical Meetings for 3 years 2017-19.
- **Mihael Serban Memorial Endowment (GBP 400)**
  Awarded funding to attend the Women in Statistics and Data Science Conference, 2016.

- **National Level INSPIRE Scholarship (GBP 3,876)**
  Awarded by the Department of Science and Technology (DST), Govt. of India from 2009-14.
- **Summer Fellowship (GBP 291)**
  Received Indian Academy of Science Fellowship, 2012.

Awards

- **Honorable Mention for the 2019 Do-Bui Travel Award.**
  Awarded by the Caucus for Women in Statistics (CWS), Joint Statistical Meetings, 2019.
- **Cyber Olympiad**
  Secured All India rank 19 in the 5th National Cyber Olympiad held on 19th February, 2006.

PROFESSIONAL AFFILIATION, LEADERSHIP, AND SERVICE

Member: Royal Statistical Soceity, American Statistical Association, Institute of Electrical and Electronics Engineers, core member of Machine Learning Initiative at Imperial, and Big Data and Machine Learning in the Natural Sciences.

Selection Panelist for Strategic Teaching Fellow at Imperial College London 2021

· Statistics Section, Department of Mathematics, Imperial College London.

Panelist for Mock Interviews at Imperial College London 2020-21

· Postdoc and Fellows Development Centre, Imperial College London.

Organizing Committee Member for Women in Data Science Pittsburgh 2018, 2019

· Women in Data Science Pittsburgh @CMU Conference, Pittsburgh, PA

Panelist for Women in Statistics at Carnegie Mellon University 2016

· Women in Statistics and Data Science Conference, Charlotte, NC

Speaker for an Outreach Talk on Opportunities in Statistics 2016

· Winchester Thurston, Pittsburgh, PA

Cultural Chair (Music), Indian Graduate Student Association 2016-2020

· Carnegie Mellon University, Pittsburgh, PA